

Strategies for Effective Retention of State Government IT Employees

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Executive Summary

While the importance of recruiting and retaining more skilled information technology (IT) employees for e-government development and homeland security has been emphasized, little studies have focused on public IT employee retention. This report analyzes how job satisfaction, job characteristics, and human resource management practices affect state government IT employee turnover intentions. To enhance our understanding of the factors affecting state government IT employee turnover intentions, survey questionnaires were sent to IT workers in 38 state governments. The final number of usable questionnaires was 789—a response rate of 21.2 percent. Response rates ranged from a low of 7.3 percent (Mississippi) to a high of 55.2 (Nevada).

The respondents' job titles were categorized as IT management, networks, system development and integration, technical service and operations, and PC end-user support. The majority of respondents (60 %) worked in systems development and integration positions. Almost two-thirds (64.1) were male. In terms of age, the sample ranged from 20 to over 65. The distribution for work experience in the current department was: less than 1 year: 8%; 1-5 years: 37.4%; 6-10 years: 15.4%; 11-15 years: 12.9%; and 16 years or more: 26.3%. A majority of respondents reported having a college degree, with 13 percent holding graduate or professional degrees. Salary levels were: under \$41,000: 23.5 %; \$41,000-\$60,000: 39 %; \$61,000-\$80,000: 23.9 %; \$81,000-\$100,000: 6 %; and \$101,000-\$130,000: 0.7%. Just under two-thirds of the respondents (64.5 %) had private sector work experience.

Among 789 respondents, 205 IT employees answered that they probably look for a job during the next year. Mean scores for job satisfaction (3.59), desires for challenging projects (3.64), and perceived job alternatives (3.52) were relatively high, but scores for satisfaction of pay and rewards (2.82), work exhaustion (2.78), promotion opportunity (2.68) and turnover intentions (2.65) were relatively low.

Results of a survey of state government IT employees showed that job satisfaction is the most significant variable influencing turnover intentions. Work exhaustion is also an important determinant of turnover intentions. IT employees who perceive effective communications with management, pay and rewards satisfaction, and fair promotion opportunities have lower levels of turnover intentions compared to those who do not. Available family-friendly policies and benefits also exert a negative effect on turnover intentions among state government IT employees. Finally, inadequate resources for IT project and desire for challenging IT project are positively affect IT employee turnover intentions. The supported hypotheses were as follows:

H1: Increased job satisfaction exerts a negative effect on turnover intentions among state government IT employees.

H2: Work exhaustion exerts a positive impact on turnover intentions among state government IT employees.

H3: Inadequate resources for IT projects exerts a positive effect on turnover intentions among state government IT employees.

H4: Increased desire for challenging IT project opportunities exerts a positive effect on turnover intentions among state government IT employees.

H5: State government IT employees who sense that they have effective communications with management will have lower levels of turnover intentions compared to those who do not.

H6: State government IT employees' satisfaction with pay and other rewards is negatively associated with turnover intentions.

H7: State government IT employees who perceive having fair opportunities for advancement and promotion will have lower levels of turnover intentions compared to those who do not.

H8: The availability of family-friendly policies exerts a negative effect on turnover intentions among state government IT employees.

The study results show that job satisfaction, work exhaustion, adequate resources for IT projects, challenging project opportunities, pay and rewards satisfaction, opportunities for advancement, and family-friendly policies are all significant variables affecting turnover intentions among state government IT employees. The data strongly suggest that the executive leaders and managers of IT departments need to acknowledge these factors when addressing the issues of employee voluntary turnover, and turnover intentions. This report concludes with several suggestions for improving IT employee retention rates.

Introduction

The Internet, World Wide Web, and other digital tools are transforming communication among government agencies, the private sector, and the public. Government service delivery is undergoing a change because of innovations in Information Technology (IT): the Internet, Geographic Information Systems (GIS), and other Web-based tools are being used by governments at all levels for projects involving external collaboration, civic engagement, networking, customer service, and homeland security (Heiman 2002; Modesitt 2002; Stowers 2002). Electronic government (e-government), a concept that emerged in the late 1990s, is viewed as a process with great potential for improving public service delivery to individual citizens (Council for Excellence in Government [CEG] 2000; United Nations and American Society for Public Administration 2001). The CEG and the Center for Technology in Government [CTG] (1999) are actively promoting e-government as a means of enhancing accountability and citizen participation.

The Center for Digital Government (2001) gathered data on eight areas of technology application for state governments in all 50 states: electronic commerce, taxation/revenue, social services, law enforcement and the courts, digital democracy, management/administration, and education (K-12 and post-secondary). The Center's findings indicate a general movement toward the innovative use of advanced technology for improving government through the electronic delivery of information and services. E-government services are clearly expanding and will continue to do so; the speed at

which the expansion occurs will be limited only by the speed at which technical and financial capacities evolve and organizational/managerial philosophies emerge.

The increasing use of advanced IT for e-government is creating new challenges and altering certain aspects of human resource management in the public sector. Specifically, in the United States, the growing dependence on IT is making trained/experienced IT employee recruitment and retention a very high priority for both private and public organizations (Agarwal and Ferratt 1999; Council of State Governments [CSG] 2000). Studies that have suggested that successful IT employee recruitment and retention is essential if e-government is to ever become a reality include the International Personnel Management Association (IPMA)(1998) and CSG (2000). In addition, the current emphasis on homeland security at all levels of government is also increasing the demand for employees with IT skills (U.S. Government Accounting Office [GAO] 2002; Heiman 2002).

Since the 1990s, state governments have analyzed the barriers of effective recruitment and retention of IT workers and tried to reform the traditional civil service system (CSG 2000). Results of a survey of the top information technology officials of 49 states (CSG 2000) showed that state governments have made changes in job classification/compensation systems to retain IT employees. Some of the changes made in state governments are as follows: salary increases, bonus programs, enhanced benefit programs, employee development programs, alternative schedules/flex time, telecommuting, and enhanced IT training programs.

One national survey of state governments in 2000 revealed more than 11 percent turnover in the IT work forces of 18 states, six to ten percent in 17 states, and less than

five percent in 12 others (CSG 2000). For comparison, the average voluntary turnover rate for all state employees was 8 percent in 1997 (Seldon and Moynihan 2000) and approximately 10 percent in 2001 (International Personnel Management Association [IPMA] 2002).

In order to retain IT talent, government agencies are making full use of their strongest assets, including job stability and security, flexibility, and their social- and civic service orientation, yet many still feel compelled to use alternative strategies to reduce their IT employee turnover rates. The costs associated with IT employee turnover and the loss of talented IT employees increase the need to identify job-related variables that affect retention (Bruce and Blackburn, 1992; Rainey, 1997). To date, little research has specifically targeted public sector IT employees.

To enhance our understanding of the factors affecting state government IT employee turnover intentions, survey questionnaires were sent to IT workers in 38 state governments to elicit their opinions on how job satisfaction, job characteristics, human resource management practices, job alternatives, and personal characteristics influence voluntary turnover intentions. This report on the survey data is organized as follows: in the next section, I will review the literature on variables associated with turnover intentions among both private and public sector IT employees and state the research hypotheses. In the next section, the results from a multiple regression analysis of the collected data will be presented, followed by a discussion of the major findings and their implications for IT work force management. The paper concludes with several suggestions for improving IT employee retention rates.

Literature Review and Hypotheses

IT Employee Turnover Intentions Determinants

The current emphasis on organizational performance and individual productivity has made retention and absenteeism major concerns for human resource managers in both the private and public sectors (Carsten and Spector 1987; Eby et al. 1999). Results of several studies of public employees demonstrated that voluntary turnover is a function of level of unemployment and geographical region, organizational size, unionization, and occupational characteristics, human resource management practices, and individual characteristics (Kellough and Osuna 1995; Lewis 1991; Lewis and Park 1989; Seldon and Moynihan 2000; Utgoff 1983).

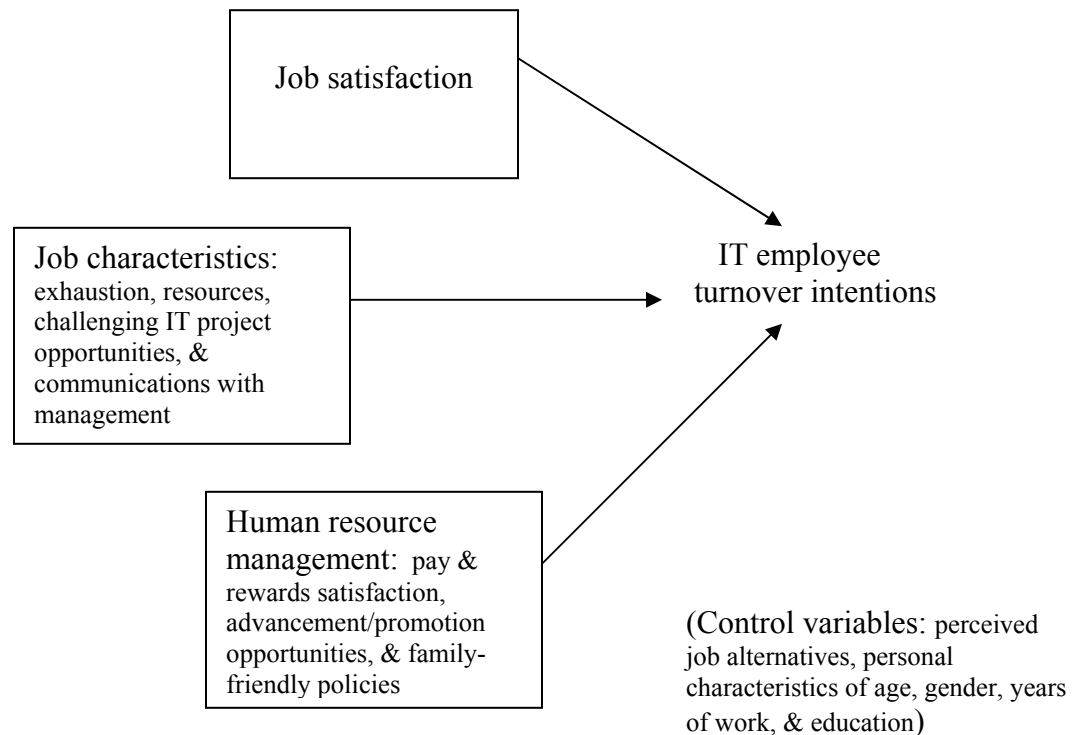
In addition, the long list of researchers who have noted that satisfied employees are less likely to be absent from work or to look for new jobs includes Carsten and Spector (1987), Tett and Meyer (1993), Hackman and Oldham (1975), Brooke and Price (1989), Barling, Wade and Fullagar (1990), Kemery et al. (1987), Pierce, Rubinfeld and Morgan (1991), and Eby et al. (1999). Not surprisingly, researchers who have specifically looked at job satisfaction and IT employee turnover in the private sector (Baroudi 1985; Compton 1987; and Igharia and Greenhaus 1992) found that job satisfaction is one of the most significant factors affecting IT employee voluntary turnover.

Scholars also found that job characteristics, defined as factors that pertain to the job itself (DeSantis and Durst 1996), have a definite effect on IT employee turnover and turnover intentions (Baroudi 1985; Compton 1987; Igharia and Greenhaus 1992; Firth

and Britton 1989; Jackson et al. 1986; Lee and Ashforth 1996; Moore 2000). The job characteristics analyzed in the present study were work exhaustion, resources, challenging IT project opportunities, and communications with management. This study also included human resource management practices as variables affecting IT employee turnover intentions. Previous research on turnover (Seldon and Moynihan 2000; Mobley 1977; Huselid 1995; Shaw, Delery, Jenkins and Gupta 1998) indicated that pay satisfaction, promotion opportunities, and available family-friendly policies decrease turnover and turnover intentions. The impact of these variables on state government IT employee turnover intentions was analyzed in this study.

Turnover research models usually acknowledge the role of employment alternatives in the turnover decision process. Findings of several studies showed that the availability of an alternative job is a precondition to quitting for many employees (Steel, Griffeth and Hom 2002; Carsten and Spector 1987; Steel and Griffeth 1989). This study included IT employees' perception on job alternatives as a control variable (Figure 1). Such personal characteristics as age, gender, years of work in the same department, and education were also included in the present research model as control variables (Lewis 1991; Lewis and Park 1989). In the next section, I will review the literature on variables associated with turnover intentions among both private and public sector IT employees and state the research hypotheses.

Figure 1. Research Model



Job satisfaction

Since the 1950s, researchers have disagreed over the relationship between job satisfaction and productivity (Brayfield and Crockett 1955; Petty, McGee and Cavender 1984; Iaffaldano and Muchinsky 1985), but more recent studies have consistently produced evidence showing that increased employee satisfaction results in decreased absenteeism and turnover (Carsten and Spector 1987; Tett and Meyer 1993; Kemery et al. 1987; Farrell and Stamm 1988; Barling, Wade and Fullagar 1990; Eby et al. 1999).

Results of several studies of IT workers in the private sector (Baroudi 1985; Compton 1987; Igharia and Greenhaus 1992) demonstrated that the most substantial and direct determinant of turnover intentions is job satisfaction. There is, however, little

research on how job satisfaction affects public IT employee turnover intentions. The following hypothesis was tested in the research:

H1: Increased job satisfaction exerts a negative effect on turnover intentions among state government IT employees.

Job characteristics

Exhaustion

Data from several private sector studies have shown associations among work exhaustion (defined by Schaufeli et al. [1995] as the depletion of mental resources), increased voluntary turnover and turnover intentions (e.g., Firth and Britton 1989; Jackson et al. 1986; Lee and Ashforth 1996; Moore 2000). Some evidence has been offered in support of the idea that technology professionals are particularly susceptible to work exhaustion. According to McGee (1996), increasing reliance and required use of home PCs, laptops, modems, faxes, beepers, and cellular phones, plus a perceived need to keep up with the latest technological advancements, are contributing to burnout among private sector technology professionals. Moore (2000) has noted that a large number of IT workers are now expected to keep technologies and computer applications functioning around the clock for their organizations, increasing the potential for technical support personnel to feel overwhelmed by job demands. Based on these studies, the second hypothesis was established as:

H2: Work exhaustion exerts a positive impact on turnover intentions among state government IT employees.

Resources & Challenging IT Project Opportunities

The current literature reveals that compared to any other profession, IT workers demand continuous learning, including exposure to new hardware and software applications (Demers 2002; HR Focus 1999; Mill 2001). Based on a survey of IT consultants, Mill (2001) found that the chance to work with leading technologies consistently ranks as one of the primary factors affecting IT employee job satisfaction. Furthermore, Demers (2002) pointed out the importance of the opportunity to use new technologies and access to technology for improving IT employee job satisfaction or motivation. Interesting projects and job challenges were also emphasized as important factors affecting retention of IT employees (HR Focus 1999). Related to IT resources and challenging IT project opportunities, this study explored the following hypotheses:

H3: Inadequate resources for IT projects exerts a positive effect on turnover intentions among state government IT employees.

H4: Increased desire for challenging IT project opportunities exerts a positive effect on turnover intentions among state government IT employees.

Communications with Management

While there are several studies on the positive effects of social/workplace relations on employee job satisfaction, including Hackman and Oldham (1976), Oldham and Cummings (1996) and London and Larsen (1999), little research explores their direct impact on IT employee turnover intentions. According to a survey of Chief Information Officers in the private sector, poor (especially insufficient) communication is the most common management error affecting employee turnover (Battey 2000). Furthermore, Mill (2001) argues that by creating an environment in which employees feel comfortable

communicating with management, organizations can generate a stronger sense of loyalty among IT staff. Thus, the fifth hypothesis was written as:

H5: State government IT employees who sense that they have effective communications with management will have lower levels of turnover intentions compared to those who do not.

Human Resource Management Practices

Monetary Rewards and Opportunities for Advancement

One of the most important variables determining retention is monetary compensation (Leonard 1987; Shaw, Delery, Jeknins and Gupta 1998; Utgoff 1983). While research on federal employment (Lewis 1991) did not confirm the importance of pay in reducing quit rates, Seldon and Moynihan (2000) found a significant and negative relationship between higher average wages and voluntary turnover rate in 44 state governments. Bergmann, Bergmann and Grahn (1994) also found that properly designed employee benefit packages are effective tools for attracting, motivating, and retaining city government employees.

One can only speculate on whether public sector IT employees have higher levels of turnover intentions compared to other public-sector employees because of the significant discrepancies that exist between public and private-sector IT salaries. Thus, the sixth hypothesis was written as:

H6: State government IT employees' satisfaction with pay and other rewards is negatively associated with turnover intentions.

Mill (2001) and Battey (2000) have both shown that timely recognition and rewards given to IT personnel in the private sector for their on-the-job accomplishments

increase employee retention. Limited advancement opportunities and lack of recognition were also identified as the top reasons for losing good IT employees in the private sector (Mill 2001). Results of a survey conducted by the United States Merit Systems Protection Board (1989) also revealed that the lack of promotion opportunities is the reason most frequently cited by federal employees who left government service for private sector jobs. Not surprisingly, Seldon and Moynihan (2000) found that state governments that allow greater internal opportunity for advancement are also more successful at retaining employees. Accordingly, this study tested the following hypothesis:

H7: State government IT employees who perceive having fair opportunities for advancement and promotion will have lower levels of turnover intentions compared to those who do not.

Family Friendly Policies

An ongoing concern for public sector personnel managers is the balancing of employees' work and family responsibilities, since shifting demographic patterns have exerted a significant impact on contemporary family life and work. These shifts include increases in female employment, two-income families, and single-parent families—all indicating that a growing number of workers are also responsible for the care of young children and elderly parents. Efforts to resolve work-family conflicts include a diverse range of family-friendly policies in both the public and private sectors. Behn (1995) and Rainey (1997) have suggested that the availability of diverse family-oriented benefits has a positive effect on individual and organizational performance.

While several researchers have reported that family-friendly programs promote job satisfaction and company loyalty among workers (Bohen and Viveros-Long 1981; Hochschild 1989; Ezra and Deckman 1996; Saltzstein et al. 2001), Seldon and Moynihan (2000) demonstrated that on-site childcare is positively associated with state employee retention. In addition, Durst (1999) found that approximately 52 percent of local, state, and federal agencies surveyed agreed or strongly agreed that family-friendly programs decreased turnover. The family-friendly policy hypothesis that was tested as part of this study was:

H8: The availability of family-friendly policies exerts a negative effect on turnover intentions among state government IT employees.

Research Methods

Sample Selection and Survey Administration

For this study, “IT employee” was defined as any employee involved in IT management, computer networks, system development and integration, technical service and operations, or PC end-user support. The study used data from a 2002 survey of IT employees working in the central IT departments or divisions of 38 state governments (Appendix 1). The sample was constructed from individual state employee directories and IT department websites. For 19 states, employee information came directly from IT departments; for 19 states, the information came from divisions within general administration and/or budget management departments. The number of IT employees in each department or division ranged from 5 to 390. Copies of the survey were distributed to 3,775 employees.

The survey was distributed in two formats. IT employees whose e-mail addresses were available from their departments' websites or state employee directories (true for 28 state governments) were directed to a Web-based online survey and sent copies of a follow-up survey by mail. The response rate for this combination was 24 percent. For the ten state governments that did not make their employees' email addresses available online, the surface mail-only survey response rate was 16.5 percent. These IT employees were also sent follow-up surveys.

Seventy uncompleted survey questionnaires were returned because the targeted participants were no longer employed by their respective agencies. From the total adjusted sample of 3,705 survey questionnaires, 801 were returned; 12 were considered invalid because they were incomplete or had been filled out by non-IT employees. The final number of usable questionnaires was 789—a response rate of 21.2 percent. Response rates ranged from a low of 7.3 percent (Mississippi) to a high of 55.2 (Nevada).

Measures

The self-administered survey instrument was designed to elicit information on employee perceptions of job satisfaction, job characteristics, human resources management practices, turnover intentions, and job alternatives as well as demographic information. Responses were recorded using a 5-point Likert scale (ranging from 1 = strongly disagree to 5 = strongly agree) or a 5-point frequency of occurrence scale (almost never, rarely, sometimes, often, almost always). Multiple items were used to measure six of the nine variables. The Appendix 2 presents the questionnaire items and coding scales associated with all measures.

Independent Variables

Job satisfaction measures. The respondents' perceptions of job satisfaction were measured with five items taken from Hackman and Oldham's (1976) Job Diagnostic Survey. They were: 1) I am generally satisfied with the kind of work I do in this job; 2) I feel a great sense of personal satisfaction when I do this job well; 3) I would recommend working here to others; 4) I feel a strong sense of belonging to this organization; and 5) The work I do on this job is very meaningful to me. The Cronbach's alpha for these five items was .68.

Jon characteristics measures. The design of the current study included four variables of job characteristics important to IT employee turnover intentions as independent variables. Work exhaustion was assessed by a three-item work exhaustion subscale which is part of Schaufeli et al.'s (1995) General Burnout Questionnaire. The three items were: 1) I feel emotionally drained from my work; 2) I feel burned out from work; and 3) It is physically straining for me to get through a work day due to the demands of my job. The reliability (Cronbach's alpha) of the three items was measured at .87.

IT project resource was measured by two item, "I do not have adequate resources to accomplish the project assigned" and "I receive an assignment without adequate resources and materials to execute it." Coefficient alpha reliability estimates for resource items was .90. Perceptions on challenging project opportunities were measured by one item, "I would like to have more opportunities for challenging and interesting projects." Communications with management was also measured by one item, "I have effective communications with the management of this organization."

HR practices measures. Three different HR practices were conceptualized and measured. Pay and rewards satisfaction was measured with items taken from Hackman and Oldham's (1976) Job Diagnostic Survey. Scores on these items were averaged to establish overall scores for pay satisfaction and advancement opportunities. Three items were used to assess satisfaction of pay and rewards in the present study. The items were: (1) "I think my level of pay is fair"; (2) "Overall, the rewards I receive here are quite fair"; and (3) "I am generally satisfied with the amount of pay and fringe benefits I receive." The coefficient alpha reliability estimates for the pay/rewards satisfaction items was .89.

Opportunities for advancement were assessed by two items taken from the Job Diagnostic Survey (Hackman & Oldham, 1976). The two items were: "This organization provides me with a fair opportunity for advancement or promotion" and "I can see opportunities for advancement in this organization." The Cronbach's alpha for these two items was .80. The availability of family-friendly policies was assessed by one item: "This agency provides diverse family-friendly policies."

Dependent Variable

Turnover intention items were taken from Porter, Crampton, and Smith (1976). It comprised two items: "I often think about quitting this job" and "I will probably look for a job during the next year." The coefficient alpha reliability estimates for these items was .77.

Control Variables

Several control variables were included in the analyses. The item for perceived job alternatives was drawn from the instrument developed by Meyer and Allen (1984).

The item was: “It is very likely that I can find a job with another employer with about the same pay and benefits I now have.” The four personal characteristics included in the survey as control variables were age, gender, education, and years of working at the same job.

Open Questions

The survey instruments also included two open questions asking survey participants specific reasons for leaving or staying current agencies. The two questions were: “If you plan to look for another job in the coming year, what are three important factors affecting your decision to look for another job?” and “If you are not planning to look for another job in the coming year, what are three important factors affecting your decision to stay in your present job?”

Results and Findings

Demographics for the 789 survey respondents are shown in Table 1. The respondents’ job titles were categorized as IT management, networks, system development and integration, technical service and operations, and PC end-user support. The majority of respondents (60 %) worked in systems development and integration positions. Almost two-thirds (64.1) were male.

In terms of age, the sample ranged from 20 to over 65. The distribution for work experience in the current department was: less than 1 year: 8%; 1-5 years: 37.4%; 6-10 years: 15.4%; 11-15 years: 12.9%; and 16 years or more: 26.3%. A majority of respondents reported having a college degree, with 13 percent holding graduate or professional degrees. Salary levels were: under \$41,000: 23.5 %; \$41,000-\$60,000: 39

%; \$61,000-\$80,000: 23.9 %; \$81,000-\$100,000: 6 %; and \$101,000-\$130,000: 0.7%.

Just under two-thirds of the respondents (64.5 %) had private sector work experience.

Table 1. Survey Respondents (N= 789)

Demographic variables	Survey respondents (%)	
Job categories	IT management:	36 (4.5)
	Networks:	87 (11)
	System development & integration:	476 (60)
	Technical service & operations:	99 (12.5)
	PC end-user support:	30 (3.8)
	Non respondents:	61 (7.7)
Gender	Female:	276(34.9)
	Male:	505(64.1)
	Non respondents:	8 (1)
Age	20-29:	53 (6.7)
	30-39:	158 (20)
	40-49:	291 (36.8)
	50-54:	162 (20.5)
	55-59:	84 (10.6)
	60-64:	32 (4)
	65 or more:	4 (0.5)
	Non respondents:	5 (0.6)
Years of work at department	Less than 1 year:	63 (8)
	1 to 5 years:	295 (37.4)
	6 to 10 years:	121 (15.4)
	11 to 15 years:	102 (12.9)
	16 years or more:	207 (26.3)
	Non respondents:	1 (0.1)
Education	High school diploma or GED plus some college:	185 (23.4)
	2-year college degree:	162 (20.5)
	4 year college:	223 (28.2)
	Some graduate or professional school:	88 (11.1)
	Graduate or professional Degree:	107 (13)
	Non respondents:	35 (4.4)
Salary	Under \$41,000:	186 (23.5)
	\$41,000-\$60,000	308 (39)
	\$61,000-80,000	189 (23.9)
	\$81,000-\$100,000	48 (6)
	\$101,000-\$130,000	6 (0.7)
	Non respondents:	52 (6.5)
Private sector work experience	Yes	509 (64.5)
	No	277 (35.1)
	Non respondents:	3 (0.4)

Descriptive statistics and correlation coefficients for the study variables are presented in Table 2. The majority of the zero-order correlations were statistically significant at $p < 0.01$. All of the measures appeared to be relatively distinct; the largest correlation (between job satisfaction and perceptions of turnover intentions) was -0.58. Mean scores for job satisfaction (3.59), desires for challenging projects (3.64), and perceived job alternatives (3.52) were relatively high, but scores for satisfaction of pay and rewards (2.82), work exhaustion (2.78), promotion opportunity (2.68) and turnover intentions (2.65) were relatively low.

Table 2. Descriptive Statistics, Reliabilities, and Correlations^a

Variable	Mean (s.d)	1	2	3	4	5	6	7	8	9
1. Turnover intentions	2.65 (1.15)	1	(.77)							
2. Job satisfaction	3.59 (0.78)	-.58	1	(.68)						
3. Work exhaustion	2.78 (1.00)	.44	-.35	1	(.87)					
4. Inadequate resources	2.92 (0.96)	.37	-.34	.51	1	(.90)				
5. Desires for challenging IT projects	3.64 (0.89)	.24	-.25	.05	.06	1				
6. Effective Communications with management	3.16 (1.08)	-.40	.48	-.24	-.29	-.18	1			
7. Pay and rewards satisfaction	2.82 (0.99)	-.37	.30	-.26	-.27	-.17	.22	1	(.89)	
8. Opportunities for advancement/ promotion	2.68 (1.08)	-.41	.45	-.27	-.26	-.31	.41	.39	1	(.80)
9. Family-friendly policies	3.28 (1.09)	-.35	.38	-.25	-.28	-.14	.34	.32	.30	1

^a N= 789. Correlations greater than .18 are significant at $p < .01$ (2-tailed).

Multivariate Analysis

Results from an ordinary-least squares (OLS) multiple regression analysis appear in Table 3. The equation achieved statistical significance at the .001 level. As predicted, job satisfaction was negatively associated with turnover intentions for the surveyed IT employees. Job satisfaction had the highest regression coefficient score among the independent variables included in the model ($-.30, p < .001$). Several studies of IT workers in the private sector (Baroudi 1985; Compton 1987; Igharia and Greenhaus 1992) showed that job satisfaction is the most substantial and direct determinant of turnover intentions. Results from the present study lend further support to this conclusion. Therefore, this study provides robust support of Hypothesis 1.

Three variables of job characteristics, including work exhaustion, inadequate resources, and desires for challenging IT project opportunities were all positively associated with high levels of IT employee turnover intentions. Specifically, IT employees who reported a high degree of exhaustion described themselves as having higher levels of turnover intentions than IT employees who reported low levels of exhaustion ($.20, p < .001$). The results also showed that IT employees who perceived high degrees of inadequate IT resources and desire for challenging project opportunities reported higher levels of turnover intentions than IT employees who did not ($p < .05, p < .01$ respectively). In addition, perceptions of effective communications with management were negatively associated with IT employee turnover intentions ($p < .01$). Thus, the data supported Hypotheses 2, 3, 4, and 5.

The regression analysis results also showed that state IT employees' satisfaction with pay and other rewards was negatively associated with turnover intentions at a statistically significant level ($p < .01$), thus supporting Hypothesis 6. Statistical support was also found for Hypotheses 7 (IT employees who perceive having fair opportunities for advancement and promotion are less likely to express turnover intentions, $p < .01$) and 8 (the availability of family-friendly policies being negatively associated with IT employees' turnover intentions, $p < .05$). The highest regression coefficient was for the data supporting Hypothesis 1—job satisfaction.

Finally, among the control variables, the data showed that IT employees who perceived a high degree of the availability of an alternative job reported a higher level of turnover intentions than IT employees who did not ($p < .05$). The results also showed that the older IT employees were less likely to express turnover intentions ($p < .01$). Female IT employees expressed a lower level of turnover intentions compared to male IT employees ($p < .05$). In this study, however, years of work and education were not significantly related to state government IT employee turnover intentions.

Table 3. Results of Regression Analysis

Variables	Regression Coefficient (β)	Standard error	<i>t</i>
Job satisfaction	-.30***	.05	-8.65
Work exhaustion	.20***	.03	6.18
Inadequate resources	.07*	.03	2.18
Desire for challenging IT project opportunities	.08**	.03	2.72
Communications with management	-.09**	.03	-2.83
Pay & rewards satisfaction	-.08**	.03	-2.72
Opportunities for Advancement/promotion	-.11**	.03	-3.44
Family-friendly policies	-.06*	.03	-1.97
Control variables			
Perceived Job Alternatives	.07*	.03	2.44
Gender	-.05*	.06	-2.06
Age	-.09**	.02	-3.14
Years of work	-.04	.02	-1.51
Education	.02	.02	.97
<i>R</i>²	.48		
<i>Adjusted R</i>²	.47		
F	51.049***		

N= 789; * $p < .05$; ** $p < .01$; *** $p < .001$

Open Questions

State government IT employees were asked to write three specific reasons for leaving or staying current agencies. Major eight items were reported in Table 4. The key reasons for looking for another job answered were salary, promotion, management, benefits, work environment, and challenges (see Table 4). These findings supported the results from the regression analysis above. Among them, salary was the most frequently mentioned as a reason for looking for a job. On the other side, there were several reasons for IT employees' decision to stay: job security, benefits, salary, retirement, job satisfaction, co-workers, challenges, and management support. Job security was the most frequently mentioned as an important reason for staying.

Table 4. Reasons for Looking for Another Job*

Three important reasons for looking for another job during the next year	Three important reasons for staying current organization
<ol style="list-style-type: none">1. Salary (144)2. Promotion (38)3. Location (25)4. Poor management (22)5. Benefits (20)6. Work environment (16)7. No challenge (15)8. Flexible work arrangement (12)	<ol style="list-style-type: none">1. Security (153)2. Benefits (88)3. Salary (78)4. Retirement (68)5. Job satisfaction (63)6. Co-workers (37)7. Challenge (35)8. Management support (21)

*Numbers in parentheses indicate the total number of survey respondents who noted each item as one of three important reasons for leaving or staying current organizations.

Implications

The study results show that job satisfaction, work exhaustion, adequate resources for IT projects, challenging project opportunities, pay and rewards satisfaction, opportunities for advancement, and family-friendly policies are all significant variables affecting turnover intentions among state government IT employees. The data strongly suggest that the executive leaders and managers of IT departments need to acknowledge these factors when addressing the issues of employee voluntary turnover, and turnover intentions.

The findings also suggest several strategies for consideration by state government agencies interested in enhancing IT employee morale and retention. The first consists of conducting employee assessments. IT employee assessments would focus on job satisfaction, job characteristics and human resource management practices, including all of the factors addressed by the study survey. Performing such assessments can be a first step in giving IT employees the perception that their departments are interested in their environment, career advancement, and job characteristics, all of which are significantly associated with turnover intentions. As job satisfaction and work exhaustion were very significant factors affecting state IT employees' turnover intentions, agencies should assess the factors affecting job satisfaction as well as work exhaustion.

Specifically, in order to reduce exhaustion, managers need to assess the workloads of individual IT workers. Once the managers and IT employees identify the major factors affecting work exhaustion, managers can do help IT workers in developing a plan of action to reduce exhaustion. For example, managers can modify work expectations, target dates of IT projects and adding resources based upon the cause of

exhaustion (Moore 2000). In addition, state agencies can take steps to a) provide their IT employees with clear definitions of individual tasks and overall job priorities; b) help their workers better understand task objectives and the reasons for performing certain tasks; c) help define the sequences in which subtasks should be performed; d) generate a greater sense of task identity so that the beginning and end of individual tasks can be readily determined; and e) give their IT employees a better understanding of the procedures by which individual tasks should be performed (Igharia & Ggreenhaus 1992). All of these recommendations may also help improving job satisfaction and ultimately retention of state IT employees.

The study results show that opportunities for challenging projects and career advancement are important factors affecting turnover intentions for the surveyed state government IT employees. Accordingly, executive leaders and managers need to create work environments in which individual employees perceive a supportive interest in their career goals.

Managers need to consider several strategies to show support for their IT employees' career development goals. Igharia and Ggreenhaus (1992) recommended that organizations should provide career planning opportunities, training and development experiences to IT employees with managerial goals. Specially, providing diverse training programs for IT workers to enhance their professional development may make them more likely to stay (Shaw, Delery, Jenkins Jr., and Gupta 1998). Organizations can also hold regular focus group meetings with their IT employees and managers to explore such issues as supervisory relationships, career development, and mentoring programs. In addition, information on career development efforts (e.g., skill and leadership

assessments, training information, and career paths) can be added to individual IT employee records to document the support given by supervisors and human resource departments to IT employees with well-defined career goals.

Another important implication of the study finding is that state government agencies will receive long-term benefits of employee retention from evaluating IT employee job classification and compensation systems and creating clear career paths for IT employees. According to the CSG survey (2000), twenty-eight states reported that they have changed their job classification and compensation systems for IT personnel. Four state governments (Maine, Massachusetts, Mississippi and Oregon), where the turnover rate of IT employee was less than 5 percent, have provided salary increases, bonus programs, enhanced IT training and increased opportunity for IT employee advancement and promotion (CSG 2000). These states have provided salary increases, bonus programs, enhanced IT training and increased opportunity for advancement and promotion. As state government, however, has experienced a budget shortfall today, the impact of state budget constraints on salary increases and bonus programs for IT professionals in the near future remains to be adequately addressed.

Developing flexible career path options provides important incentives for technical personnel to stay with their organizations instead of searching for new positions (Igharia & Ggreenhaus 1992). Such opportunities should be based on information collected from regular career counseling sessions. By letting employees know the variety of career paths that are available to them, state government agencies can reduce feelings of neglect that often lead to increased turnover (Compton 1987).

The data on human resource management practices also revealed a negative association between available family-friendly policies and state government IT employee turnover intentions. Seldon and Moynihan (2000), and Durst (1999) have suggested that available family friendly programs decreased turnover. Further research in this area would benefit from analyzing the relationship between specific family friendly policies and the rate of turnover by gender and individual characteristics. Finally, exit interviews with departing IT employees can be a great human resource tool to determine why they have resigned voluntarily (IPMA 2002).

All of these suggestions for effective retention of state IT employees require commitments from organizational leaders to replace traditional personnel management practices with strategic human resources management practices. Specially, with the emergent emphasis of homeland security and e-government, agency leaders, IT managers, and human resource managers collaboratively respond to fundamental environmental changes in order to encourage IT workforce planning, human capital management, and organizational performance. Finally, human resource managers and IT project managers need to consider the best means of facilitating IT work force planning for organizational performance—for instance, holding focus group meetings to discuss emergent issues of IT workforce, IT projects, and to address general issues of organizational effectiveness.

Conclusion

The associations among job factors and state government IT employee turnover intentions explored in this study can also be the subjects of research with federal and local government IT employees. An assessment of the validity of the findings presented

in this paper would be especially valuable. Future projects should also focus on: a) associations among state unemployment, geographical region, and turnover intentions; and b) comparative studies of private and public sector IT employees.

Two limitations to this research should be noted. First, the measures used here were perceptual rather than objective; a more complete analysis would require additional data from interviews of IT employees and longitudinal studies of the dynamics and patterns of voluntary turnover in state government. Second, little data is available on the numbers and personal characteristics of IT workforce in state governments, therefore it is unclear whether survey respondents were representative.

In conclusion, the results suggest that job satisfaction, job characteristics, and human resource management practices exert significant effects on turnover intentions among state government IT employees. The findings imply a need for greater organizational and managerial commitment to performing IT employee and organizational assessments and for using career development support of IT employees working for state agencies.

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Appendix 1: Participant IT Agencies

Alabama (Information Services Division), Arkansas (Dep. of Information System), Arizona (Governor's Information Technology Agency), Colorado (Government Technology Services), Connecticut (Dep. of Information Technology), Delaware (Dep. of Technology & Information), Florida (Chief Information Officer Council members), Georgia (Government Technology Authority at the Dep. of Administrative Services), Idaho (IT Council in the Dep. of Administration), Illinois (Technology Office), Indiana (Information Technology Oversight Commission), Iowa (Information technology Department), Kansas (Division of Information Systems at the Dep. of Administration), Kentucky (Governor's Office for Technology), Louisiana (Office of Information Systems), Maryland (Office of Information Technology at the Dep. of Budget & Management), Massachusetts (Information Technology Division at the Executive Office for Administration & Finance), Michigan (Dep. of Information Technology), Minnesota (Office of Technology at the Dep. of Administration), Mississippi (Dep. of IT Services), Missouri (Office of Information Technology), Montana (Information Services Division at the Dep. of Administration), Nebraska (Information Management Services Division at the Dep. of Administrative Services), Nevada (Dep. of Information Technology), New Jersey (Office of Information Technology), New Mexico (Information Systems Division at the General Services Department), North Carolina (Office of IT Services at the Governor's Office), North Dakota (Dep. of Information Technology), Oklahoma (Data Processing & Telecommunication Division at the Office of State Finance), Oregon (Information Resources Management Division at the Dep. of Administrative Services), South Carolina (Office of Information Resources at the State Budget & Control Board), South Dakota (Office of Technology & The Bureau of Information & Telecommunications), Texas (Dep. of Information Resources), Tennessee (Office of Information Resources), Utah (Division of Information Technology Services), Virginia (Dep. of IT Services), Washington (Dep. of Information Services), and West Virginia (Information Services & Communications at the Dep. of Administration).

Appendix 2: Survey Items

Items were measured on a five-point Likert-type scale, with 1 for “strongly disagree” and 5 for “strongly agree” or a five-point frequency of occurrence (1= almost never, rarely, sometimes, often, and 5= almost always) unless otherwise noted.

Job satisfaction

1. I am generally satisfied with the kind of work I do in this job.
2. I feel a great sense of personal satisfaction when I do this job well.
3. I would recommend working here to others.
4. I feel a strong sense of belong to this organization.
5. The work I do on this job is very meaningful to me.

Work exhaustion

1. I feel emotionally drained from my work.
2. I feel burned out from work.
3. It is physically straining for me to get through a work day due to the demands of my job

Resource

1. I do not have adequate resources to accomplish the project assigned. (-)
2. I receive an assignment without adequate resources and materials to execute it. (-)

Challenging IT project

1. I would like to have more opportunities for challenging and interesting projects.

Pay & rewards satisfaction

1. I think my level of pay is fair.
2. Overall, the rewards I receive here are quite fair.
3. I am generally satisfied with the amount of pay and fringe benefits I receive.

Opportunities for advancement/promotion

1. This organization provides me with a fair opportunity for advancement or promotion.
2. I can see opportunities for advancement in this organization.

Work-Family Policies

1. This agency provides diverse family-friendly policies.

Communications with management

1. I have effective communications with the management of this organization.

Turnover intentions

1. I often think about quitting this job.
2. I will probably look for a job during the next year.

Job alternatives

1. It is likely that I can find a job with another employer with about the same pay and benefits I now have.

Years of work

1. How many years have you been in this organization? (1=less than 1 year, 2=1 to 5 years, 3=6 to 10 years, 4=11 to 15 years, and 5 = 16 years or more)

Gender

1. Are you (0 = male, 1 = female)

Age

1. What is your age? (1= 18-20, 2 = 20-29, 3=30-39, 4=40-49, 5=50-59, 6=60-64, and 7= 65 or more)

Education

1. What is your highest educational level? (1=high school diploma or GED, 2=high school diploma or GED plus some college, 3=2-year college degree (AA, AS), 4=4-year college degree, 5=some graduate or professional school, and 6=graduate or professional degree)

Open questions

If you plan to look for another job in the coming year, what are THREE important factors affecting your decision to look for another job?

If you are NOT planning to look for another job in the coming year, what are THREE important factors affecting your decision to stay in your present job?